FAA
general aviation NEWS
MARCH-APRIL 1979
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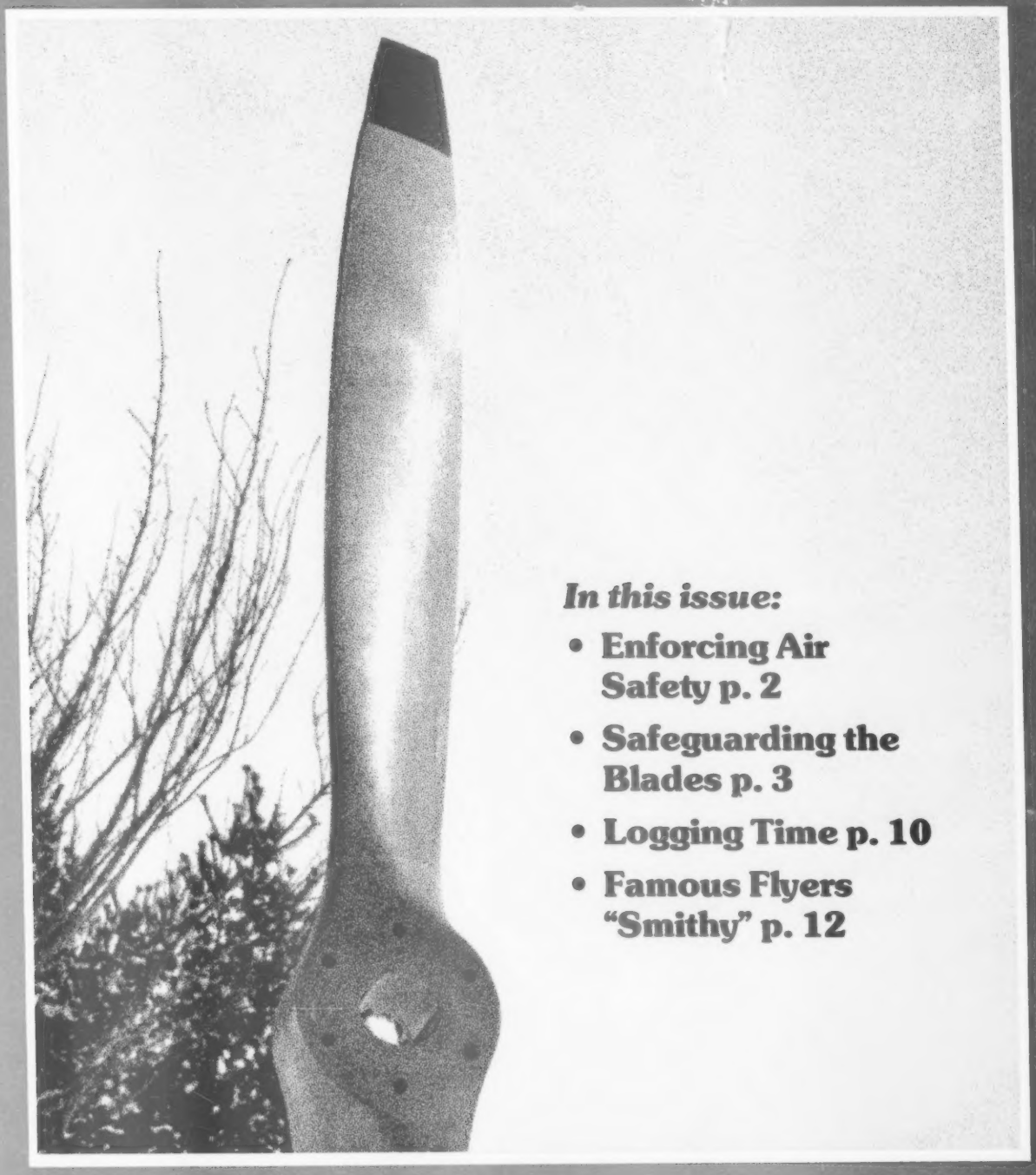

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FAA GENERAL AVIATION NEWS

**DEPARTMENT OF TRANSPORTATION/
FEDERAL AVIATION ADMINISTRATION**

MARCH-APRIL 1979

VOL. 18, NO. 2

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FAA GENERAL AVIATION NEWS is published by Flight Standards Service, Federal Aviation Administration, Department of Transportation, Washington, D.C. 20591, in the interest of flight safety. The magazine is designed to promote safety in the air by calling the attention of general aviation airmen to current technical, regulatory and procedural matters affecting the safe operation of aircraft. Use of funds for printing FAA GENERAL AVIATION NEWS was approved by the Office of Management and Budget through August 31, 1980. All printed materials contained herein are advisory or informational in nature and should not be construed as having regulatory effect. The FAA does not officially endorse any goods, services, materials or products of manufacturers that may be mentioned. Certain details of accidents described herein are altered to protect the privacy of those involved.

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BRIEFS

ENFORCING AIR SAFETY. FAA has modified its policy of granting airmen and controllers immunity from enforcement of penalties for violating air safety regulations. For the past three years, violators who reported their own misconduct were allowed to remain anonymous, and no fines or other penalties were assessed. The new policy will enforce safety regulations whenever a violation takes place "in full public view" and is reported by witnesses.

FAA Administrator Langhorne Bond has pointed out that the guarantee of immunity "can too easily be corrupted into a license to endanger hundreds of lives with no fear of punishment." Strict enforcement of rules, he said, is one of our most effective ways of keeping the potential for human error to a minimum.

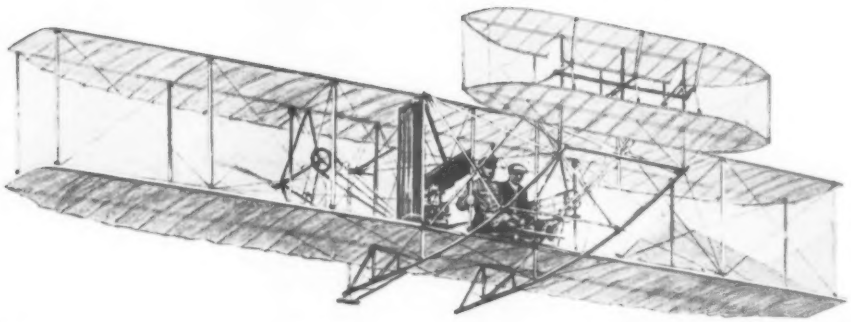
HAZARDS OF SPRING. A 40 knot headwind that changed into a 28 knot tailwind, during the brief period between takeoff roll and liftoff, was a major factor in the near-catastropic accident of a Boeing 727 air carrier at Tucson, Arizona, according to findings of the National Transportation Safety Board. Rapid lateral wind shifts of up to 90 degrees were also reported by the control tower at the time. The aircraft (with 91 aboard) was unable to clear power lines and poles in its departure path and suffered substantial hull and wing damage, but fortunately was able to land safely. Spring is commonly a season of rapid wind shifts, and all pilots should be alert for them during takeoff and landing. Use of full runway is a good safety precaution against abrupt diminution of headwinds.

FAR REVISING THE RULE. The Aircraft Owners and Pilots Association, AOPA, has petitioned FAA to carry out a reorganization and simplification of Part 91 of the Federal Aviation Regulations--the Part which deals with basic operating and flight rules.

The petition asks that the Part be separated into seven subparts, with the first two parts containing everything that most student and private pilots would need to know. The remaining five subparts would cover instrument operations, flight instruction, aerobatic flight, commercial operations, turbine powered aircraft, maintenance rules, etc. The language of a number of rules would be clarified.

FAA has published the petition as an Advance Notice of Proposed Rulemaking, soliciting airman reaction to the proposals before the agency determines what action, if any, will be taken to revise Part 91. Comments should be sent in duplicate to FAA, Office of the Chief Counsel, Attn: Rules Docket (AGC-24), Docket No. 18334, 800 Independence Ave., S.W., Washington, DC 20591. Dateline should be no later than April 23, 1979. Copies of the petition are available from FAA, APA-430, at the same address. Telephone 202-426-8058 for expediting delivery.

Safeguarding the Blades



The first fatal aircraft accident was not due to adverse weather, or engine failure, or pilot error, as one might suppose. No one knew more about flying than the man at the controls of the *Military Flyer*, which was being test-flown for the U.S. Army at Fort Myer, Va., on that ill-fated September day in 1908. The pilot was Orville Wright himself, co-inventor of the airplane.

The *Military Flyer* was a vastly improved version of the original (1903) *Wright Flyer*, accommodating two persons seated upright and capable of flying for approximately one hour at 40 mph. It still had no wheels, and the takeoff was catapult-assisted from a small trolley, but the airplane was remarkably stable in flight and the U.S. Signal Corps had commissioned it for wartime reconnaissance. Their official observor was Lt. Thomas Selfridge, also an aviation pioneer.

Accompanied by Selfridge, Orville was demonstrating the aircraft in flight on the afternoon of September 17 when the admiring crowd below saw it abruptly go out of control, whirl to the ground and crash with a sickening impact. One of the large wooden propeller blades had broken, causing the prop to twist out of its normal arc and sever a rudder control wire. Selfridge died almost instantly from a skull fracture, and Orville received serious injuries, including a hip injury which troubled him the remainder of his life—and in fact led to his giving up flying within a few years.

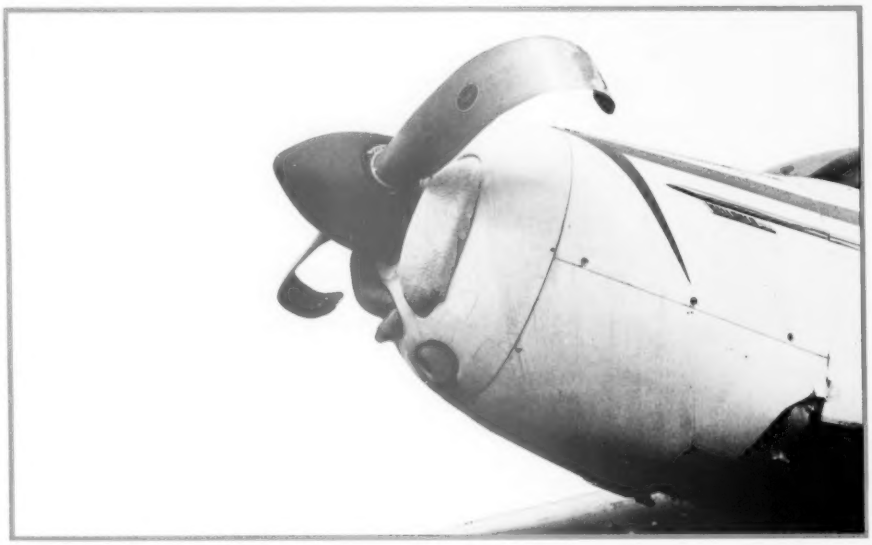
Much has been learned about propeller safety since that accident. Modern blades are most commonly made of metal, usually forged aluminum alloy for general aviation aircraft, and are carefully designed to tolerate anticipated stresses. Nevertheless, what has not changed is the fact that the propeller represents the end of the entire energy chain of an aircraft engine: it is required to withstand all the forces involved in pulling or pushing an airplane through the air. Also unchanged is the fact that weight must be kept to a minimum on aircraft, and that each blade has a limited tolerance for stresses beyond its design stress point. In a word, it is breakable when overstressed.

If it should break in flight you have a potential bearcat on your hands. Once a portion of the blade snaps off and the propeller becomes unbalanced, strong vibrations ensue which could tear the engine away from the airplane and do other serious structural damage. If the pilot has sufficient altitude at the time, and keeps his head and acts swiftly, he can usually bring the airplane down to an emergency landing. If the break occurs at a critical phase of flight, such as takeoff, the consequences are likely to be serious.

Data provided by the National Transportation Safety Board for the years 1975 through 1977 show 83 accidents in which propeller failure was involved, including 48 cases of blade separation. This, of course, does not tell the whole story; the number of pilots who experienced an inflight blade failure and landed safely with minimal damage is not known, since these are not classified as "accidents." Other data from the latest two-year tabulation of FAA Malfunction and Defect Reports lists some 472 instances of propeller failure from neglected maintenance. About half of these were blade failure of one kind or another.

These reports mention not only broken blades but also such items as severe cracks, loose blades, cracked hubs, leaking oil, missing nuts, etc. In many of these cases the failure was not known at the time the aircraft was brought in for repairs, but was discovered in the course of a routine periodic inspection, or while the plane was in the shop for other repairs.

What is of concern to pilots is not the total number of propeller blade accidents but the fact that almost all of them could have been prevented if *more serious attention were given by pilots to the propeller's condition during preflight examinations.* Nothing about an airplane is more obvious or visible than the propeller; no removal of covers or cowling is required to inspect it on preflight; no equipment is needed for this purpose other than eyes and hands; and no particular mechanical knowledge is required. And yet, if you stand around a general aviation tie-down area and watch a number of such pre-flights, you will find it is often possible to count the number of seconds given to examining the propeller



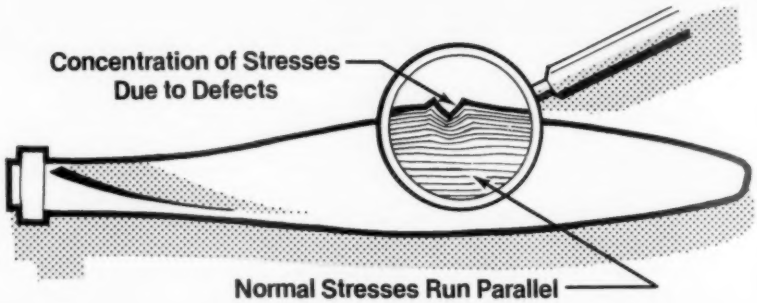
on the fingers of one hand. We just do not expect anything to go wrong with it.

Why?

Somehow it seems difficult for most pilots to become concerned about small nicks or pockmarks on what appears to be a sturdy slab of metal. It may be that because the propeller is normally seen either at rest, or else as a nearly invisible circle of movement, the casual observor is unable to appreciate the enormous stresses that come to bear upon it, or see how much flexing the apparently rigid blades endure. And if he is not scientifically-minded he has difficulty understanding the apparently insignificant symptoms of which can cause a blade to fail. A little background information on this subject can be a lifesaver.

In normal operation there are two main kinds of stress acting on the propeller; *dynamic* and *vibratory*. The so-called *dynamic stresses* consist principally of centrifugal force and *thrust*. The airload developed by thrust tends to bend the blades out of the plane of rotation, whereas the outward pull of centrifugal forces tends to keep this plane flat. The resultant dynamic force on the blade of a light aircraft may be as high as 15,000 lb. per sq. in. or higher.

Figure 1.



The second primary stress, *vibratory*, is brought about by loads on the propeller which tend to stretch and compress the metal alternately. This "bending motion" is derived mainly from the piston engine, which even when perfectly tuned produces a staccato stream of power impulses from the cylinders as they fire alternately. This pulsation causes the blade tips to move back and forth during each cycle of vibration.

Blades will withstand the combined forces unless some change in the operating conditions steps up the stress load excessively. Recognized causes of added stress include rough-running engines, over-speeding, and excessive manifold pressure (over-boost); surface damage, unacceptable straightening and resonance peaks induced by continued operation at unfavorable rpm.

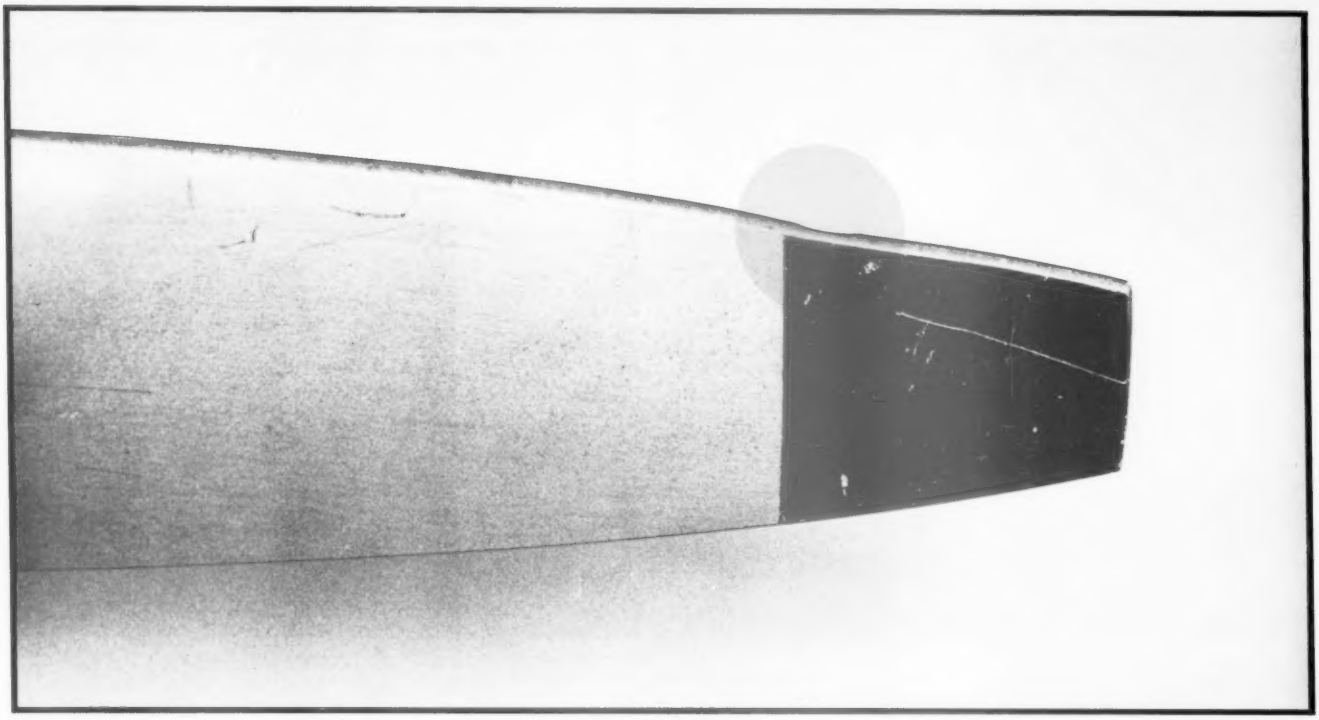
The first three items are easily understood and obviously demand remedial attention. On the other hand, to some pilots, physical damage and forbidden rpm ranges are less apparent threats to flight safety, because vibrating stress is difficult to visualize.

A metal propeller, like a tuning fork, has its own "natural" vibration frequencies, depending upon shape and thickness. If the engine vibrations coincide with these natural propeller frequencies, the combined vibratory stress is known as a "resonance peak," which may be so excessive, if prolonged, as to exceed the fatigue limit of the blade. Propellers are design-tuned for particular engines and aircraft in order to keep dangerous resonance peaks outside of normal operating ranges. That is why it is most important to heed any existing placard or flight manual prohibitions against continued operation in certain rpm ranges. A resonance peak can cause the propeller tip to vibrate over a gap as wide as several inches; which in some circumstances could induce fatigue.

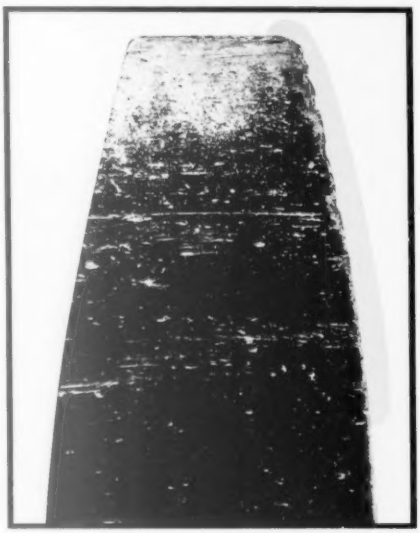
Incidentally, an inaccurate tachometer can lead to unsuspected propeller blade fatigue by allowing the pilot to operate within a restricted rpm range unknowingly or to exceed the redline. Checks of tachometer accuracy are recommended at least annually. FAA is now conducting a nationwide program involving random testing of tachometers in general aviation—in response to concerns expressed by propeller manufacturers. Simple, portable equipment is available at most shops, and can be used to make this test while the engine is running.

Resonance peaks will normally not be heard or felt by the pilot. As a matter of fact, a power setting in a prohibited rpm

Strobe light "freezes" blade tip separation (2 inches) during artificially induced vibrations.



Previous repairs, improperly carried out, caused this propeller to be rejected as unairworthy when it was sent to the manufacturer for an overhaul. Excessive metal was removed near tip (above). Face of blade (right) shows extensive deep pitting and nicks.



range may produce a deceptively quiet and smooth performance—so much so that some pilots of multi-engine aircraft have been misled into interpreting this apparent smoothness as an indication that the flight manual is in error, as regards resonance peaking in their aircraft. Such naive assumptions can result in dangerous fatigue accumulation in the propellers, which may fail without warning.

As noted, the apparently rigid propeller blade undergoes a continuous interplay of movement in operation, which can be tolerated safely within design limitations. However, a perceptable weakening of the blade, from a nick or gouge, in a critical location, can lower that tolerance significantly. It may help to think of the blade as a stiff strand of metal which can be pulled, twisted and bent without breaking as long as it is unblemished. But file a small nick into its surface, and it may easily be broken apart at this point, in response to repeated bending. With a propeller the bending action comes obviously from vibrations, while the pulling and twisting are brought about by the dynamic forces—especially centrifugal force. The latter develops pathways leading from the hub out to the tip, and the force is distributed over the blade along equidistant lines. When the blade is nicked, on an edge or surface, these equidistant lines of force are crowded together, intensifying the stress at this point and leading eventually to cracking and separation (see figure 1).

Blade separation takes place directly along the chord of the blade. By far the greatest number of blade failures are traceable to neglected nicks in the leading edge or propeller face.

The rate at which such a nick-crack-

Aluminum blades are hand-worked by skilled craftsmen to final contour (left) and smoothed to mirror-like finish. Wooden propellers (right) are built up of as many as 18 laminations for uniformity of grain. Wooden blades are less susceptible to vibratory stress than metal blades.

separation failure progresses is not predictable, since it is impossible to know when a particular combination of flight conditions may coincide with enough fatigue damage to bring about failure. However, it seems clear that the longer an injured blade remains in operation, the more likely it is to develop a crack which is irreparable. A repair in time could save a blade, and even a life.

A recent accident in southern Missouri is a case in point. The pilot/owner, a farmer, had been operating his Piper *Cherokee* for over 3,000 hours without having any significant repair work done on the propeller. One morning a mechanic who was doing some minor repairs to the nose gear called his attention to several prominent nicks on the face of the propeller, obviously of long standing. The pilot shrugged and said simply that the blade had lasted this long, it would hold out for another few weeks, until he sold the airplane.

The next day the pilot flew up to St. Louis on business and started back that evening with two friends on board. He did not arrive that night, and was not located until late the next morning—in the wreckage of the airplane, where all three occupants were dead. The investigation disclosed that 12 inches of one propeller blade was missing, engine mounts were fractured, and a portion of the windshield was shattered prior to impact. It had been a dark, moonless night, and even though the aircraft was over open farm country at the time of blade separation, evidently the pilot had either lost control or had been unable to see sufficiently well to land safely without power. Laboratory examination revealed that separation had taken place along a deep crack emanating from an untreated nick. The crack had extended two-thirds of the distance of the chord before separation. *One flight too many with a neglected prop.*

The disinclination of many pilots to really examine propellers carefully, on preflight, stems from many causes. If the pilot is renting he may assume that propeller maintenance is the prerogative of the owners, and rely on the 100 hour inspections to catch any blade defects. If the renting pilot is a student he may feel reluctant to tell the operator that he does not want to fly the airplane with the existing propeller damage —especially if the latter happens to be a grizzled veteran who flew with Lindbergh, and pooh-poohs the student's findings. But the first law of survival in flying is, *Always take personal responsibility for your own safety so far as that is possible.*

There are many aspects of aircraft maintenance which require taking someone else's word about airworthiness, but propeller blades do not quite fall into this category. What you see is, by and large, what you've got. It is possible for a propeller to receive serious damage from flying rocks or other debris that would render it non-airworthy an hour after it has left the shop. Aircraft with tricycle landing gear are most susceptible to damage from rocky debris, because the propeller is closer to the ground.

Some pilots feel uneasy about inspecting a propeller closely because they have a healthy fear of its destructive potential (inadvertent start when blade is handled). Others are vexed by their difficulties in distinguishing between "normal wear or corrosion" and physical damage. They prefer to leave maintenance decisions up to the professionals, even when they own their airplane. But no one is in as good a position to know the history of a propeller as the pilot who flies the airplane regularly. And damage assessment need not be complicated: *any surface irregularity should be brought to the attention of a certificated powerplant mechanic.* The mechanic may be able to "dress out" the area himself, if the repair is minor (in some cases without removing the blade); if it is major or an overhaul is required, he must send it to an FAA-approved *propeller repair station* or to the manufacturer.

Note that there is no FAA regulation requiring periodic overhaul of propellers used in personal flying. The propeller manufacturers establish maximum safe periods between overhaul: compliance is the responsibility of the owner.

Propellers are examined for airworthiness during 100 hour or annual inspections and repairs will be required if damage is found. The mechanic determines whether the needed repair is major or minor, but in many cases the owner has the option of deciding how much maintenance is to be done. For example, if it is a major repair the propeller must go to an FAA approved propeller repair station, which will carry out whatever work is needed to restore the propeller to an airworthy condition—if this is possible. (If it is not possible, because required repairs would remove too much metal or for any other reason, the owner will be notified and the propeller appropriately tagged or stamped as unairworthy.) Some shops will routinely *overhaul* a propeller after any major repair; others will not unless requested. It is important to understand the difference between an overhaul and a repair.

An overhaul is a complete disassembly,

inspection, and repair, and includes removing all paint and anodizing. The entire surface of the blade is etched in order to reveal any fatigue cracks. Additionally, some manufacturers recommend recontouring and resurfacing the blades, a process which involves removing a fraction of an inch of metal from the entire blade surface. This process not only aids in the discerning of hairline cracks but is also believed by these manufacturers to prolong the lifespan of the blades.

The manufacturers believe that vibratory stress accumulates fatigued areas in a metal blade from the surface inward, and that the lines of force tend to become jammed together in this area *even in the absence of visible physical damage*. Removing a very thin outer layer of metal during the overhaul is thought to prolong the life of the blades, by restoring the normal pathways of the lines of force. A complete overhaul, incidently, of a fixed pitch propeller, may be done for less than $100, a fraction of the (new) replacement cost.

Many repair shops offer an "instant replacement"—that is, instead of having to wait for overhaul to be completed, the owner can accept a replacement propeller—one that has already been overhauled. In some cases pilot may even be able to rent a propeller until their own is ready.

It is desirable to ascertain and maintain the time-in-service record of any replacement propeller. The total accumulation of hours is a factor in determining how many subsequent overhauls you may wish to have done before replacement. Some owners make a point of making sure they get their own overhauled propeller back by matching its serial number against their records.

Some shops will routinely carry out an overhaul following any major repairs; others will overhaul only at the request of the owner. The dollar savings involved in bypassing the overhaul could be a dangerous economy measure for this key component, especially if the owner is not thoroughly familiar with the life history of the propeller, or if the recommended time between propeller overhauls has been exceeded and vibratory fatigue has begun to accumulate.

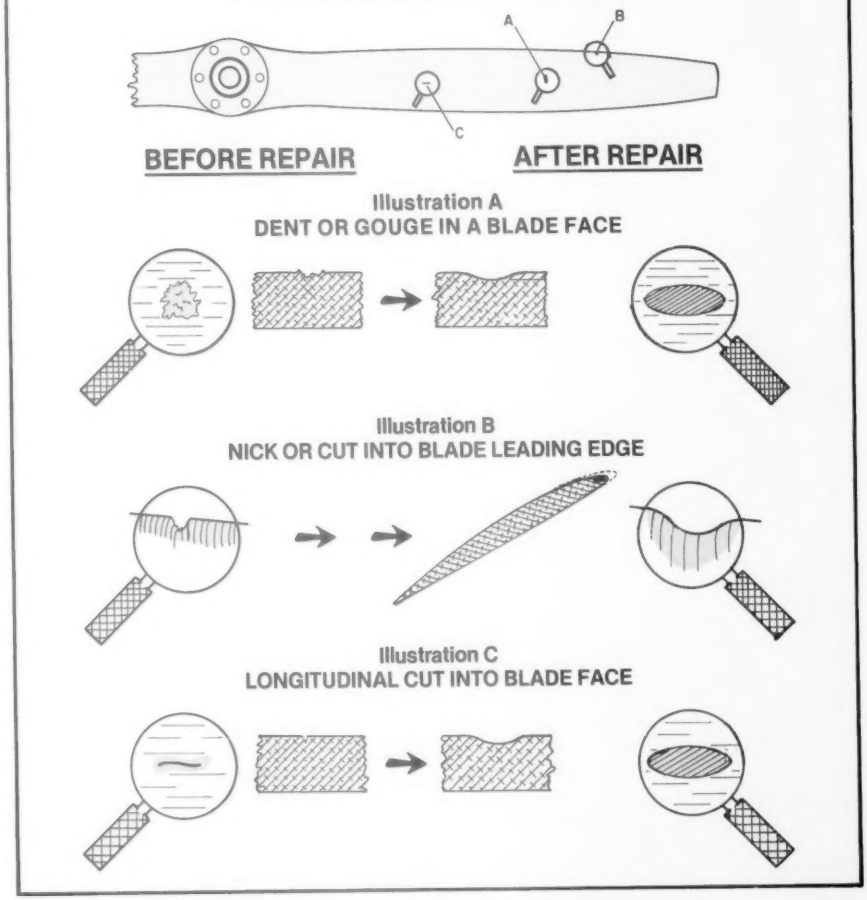
When repair work or an overhaul is done at an approved propeller repair station, inspection for fatigue cracks must be performed according to certain approved methods, which include acid etching, dye penetrants, X-ray photography and ultrasonic testing. Acid etching and dye penetrants act by bringing to light minute, filament-like cracks which can be seen after the surface has been specially treated. X-ray photography, which requires expensive equipment and a highly trained operator, is valuable for detecting subsurface cracks or flaws, which may have originated from propeller abuse, such as improper straightening. Ultrasonic testing, also requiring sophisticated equipment, passes extremely high frequency sound waves through the material and measures the rebound rate. It can detect cracks which might not be spotted even with radiography. The latter two procedures are used in unusual circumstances.

Straightening a bent propeller is a critical operation. Stories abound of bush pilots hammering a prop straight over an open fire after a bad landing in the wilderness and flying merrily off again, and there may be some truth in these stories. But this does not change the fact that the propeller is no longer airworthy, and has probably been weakened to the point, where it will soon fail. Heat straightening is likely to change the temper of a metal blade, making more or less brittle at this point and less able to tolerate normal vibration forces or other loads. *Excessive* bending also reduces the ability of the blade to tolerate vibration. This kind of damage may leave no visible evidence after the repair, until fatigue cracks begin to appear in the course of continued operation, and separation occurs.

The qualified mechanic will have access to manufacturer's data which will tell him exactly how far a given blade may be bent (this varies according to the "station," or distance from the hub) without weakening the metal to the point where it could not be straightened and safely used again. He may also perform a "hardness" check. The repair shop will keep a record of the repair, which is important in the event that similar damage occurs again to this propeller. Successive bends in the same area, even though within the allowed limits of deflection, could render the material brittle and nonairworthy.

The owner can protect himself (and future users of the propeller) by maintaining a careful record of where and when maintenance is done. Propeller manufacturers usually provide appropriate maintenance records in the form of log books with new equipment. Whenever the history of a propeller is not clearly available, before it is put into service it should be thoroughly overhauled and inspected. The new owner

Figure 2
APPROVED TECHNIQUES FOR REPAIR OF BLADE DAMAGE



may request radiography or ultrasonic testing if he suspects previous abuse or non-approved maintenance.

Minor damage, consisting of nicks cuts, gouges, etc., may be repaired by any qualified powerplant mechanic. The repair consists of rounding and smoothing out damaged area in the manner prescribed by the manufacturer. (See figure 2) The objective is to enable lines of force to flow through the area without being abruptly jammed together—not simply to eradicate the damaged area.

Regardless of how "minor" a repair may be, regulations require that it be followed by an inspection procedure for fatigue cracks in accordance with the manufacturer's recommendation—which in most instances will call for local use of dye penetrants or etching material, in addition to scrutiny with a magnifying glass of specified power. (Few persons can spot fatigue cracks on untreated surfaces with the naked eye.) The concerned owner can ask the mechanic for a detailed explanation of what was done.

It is a simple matter to test locally for fatigue cracks after minor damage. Dye penetrants, for example, come in convenient kits which any mechanic can make use of at relatively little expense. You can also request a dye-penetrant check as a part of your next 100 hour or annual inspection. This "one step beyond" precaution is good insurance.

Most mechanics can be counted upon to advise the owner appropriately, but pilot unfamiliarity with the subject can lead to misunderstandings of a serious nature. Some very experienced airmen have made unwarranted assumptions about the scope of a propeller overhaul or servicing, with tragic consequences.

Minor repairs, including dye penetrant inspection, can often be performed without disembling the propeller. Fatigue cracks are seldom seen by the naked eye.

A recent accident near Atlanta involved a pilot who was known throughout the state of Georgia for his promotion of aviation safety. He had started flying in 1960, had acquired an ATP rating within three years, had built his own racer and acrobatic airplane and had owned several conventional aircraft. A successful printer by profession, he nevertheless seemed to be one of those rare individuals who were born to fly, with a natural gift for handling an airplane. Friends liked to fly with him because he was so relaxed and at ease in the cockpit, and yet so obviously in control that everyone else was able to relax. He loved flying, he said, because it brought out the best in a man, and he always seemed to be able to find time to go flying with a friend who was a novice pilot or who had problems learning some technique. Tapped by FAA's Accident Prevention Program to be a voluntary Counselor, he contributed not only his counsel but also free press time in his printshop for running off reams of literature on accident prevention. His personal motto was, "Know what you are doing at all times."

Ironically, it was a missing piece of information that may have cost him his life.

Lately he had been flying as part of an aero club headquartered at Centreville Airport, near Atlanta, using the club's Mooney *Mark 20*. He had scheduled the Mooney for a pre-Christmas flight to Florida, but had cancelled out, partly for business reasons, but mainly because he did not like the look of the propeller. Several of the club members had been practicing forced landings with the plane in an open field, resulting in an assortment of nicks on the face of the blades—and removal of paint. He called this to the attention of the club's mechanic, and asked about having the propeller serviced. The mechanic said he could have the work done immediately after the holidays.

TYPICAL BLADE DAMAGE

DEFINITIONS	REPAIRS	CAUSE
Corrosion Pitting. Tiny deep cavities extending inward from the surface, may tunnel under surface and reappear.	Resurface area. If pitting is too deep, blade must be discarded.	Corrosive environment, failure to maintain wiped and oiled.
Crack. Physical separation of metal, extending inward to unknown depth.	Usually non-reparable.	Metal fatigue from untreated damage, or accumulated vibratory stress.
Cut. Loss of metal at surface over long, narrow area.	Smooth out with file and emery cloth.	Glancing blow from sharp object.
Gouge. Deep groove in surface	File and smooth, unless beyond tolerance.	Contact with heavy object.
Nick. Notch in leading or trailing edge.	Round out with file and emery cloth.	Contact with hard object.

Note: Propeller repairs are not preventive maintenance, and may be done only by a qualified mechanic.

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SUMMARY OF PROPELLER FAILURES 1975-1977

Phase of operation:

In flight/normal cruise	45
Landing/descending/final approach/touchdown	22
Takeoff/initial climb	16
Total	83

Fatal:

There were 8 fatal accidents, with 21 fatalities.

Purpose of flight:

Pleasure	35
Aerial application	12
Air taxi	12
Business	10
Instructional	6
Corp., Exec.	3
Ferry	3
Misc.	2

Blade separation or fatigue:

In 48 of the 83 accidents the blade either separated or cracked severely.

Source: Data derived from study of National Transportation Safety Board accident files.

On the morning of February 1, the pilot, his wife and two young sons took off from Centerville for their long-delayed winter vacation. The airport manager, who was operating the UNICOM radio, saw the plane make a normal departure and climb to a height of approximately 75 feet over the runway. At that point he saw the airplane bank very sharply to the left and disappear behind a clump of trees at the edge of the airport. Moments later he heard a loud explosion and observed smoke rising over the trees. He called police and rushed to the scene in his own emergency vehicle. He found the aircraft engulfed in flames, with all four occupants trapped inside the wreckage. There were no survivors.

The investigation of this accident focussed on the propeller, which had separated in flight at a point approximately seven inches from the tip. The ensuing vibration at full takeoff power led to failure of the engine mounts. The wreckage path suggested that the aircraft bank angle immediately after blade separation was nearly vertical, and had apparently precipitated a high speed stall, with insufficient altitude to effect a recovery. The laboratory report noted "an enlargement of grain structure along with definite softening of the metal at and several inches from the fracture." Apparently some type of straightening had been carried out with the aid of localized heat, at some undetermined point in the history of the propeller. X-ray photographs showed this area to be surrounded by fatigue crack filaments. Blade failure from metal fatigue was given as the probable cause of the accident.

The club president (who had authorized the repair work) stated that at a meeting in December the late pilot had brought up the condition of the Mooney's propeller and explained the need for chemical or X-ray testing to check for possible cracks in the blade, since the recommended time between overhauls for this propeller had been far exceeded, according to the logbook.

It was the club members' understanding that this testing was to be done during the servicing of the propeller. However, the club's mechanic stated to investigators that he had been told only to "do what was necessary." In his view, repairing the small nicks in the blades did not constitute a major repair; he had done the work himself, inspected locally as required, and returned them to service. He said he was not aware of any previous repair work on this propeller that involved straightening a bent blade so he had no reason to believe penetrant inspection of the entire blades was in order. And no one had requested this.

The lesson of this unfortunate accident is, to pilots and owners threefold. *One*, learn something about propeller maintenance, particularly the scope of an overhaul, a major repair and a minor repair; make sure that a chemical or more sophisticated test for fatigue cracks is made following *all* repairs. *Two*, learn something about approved procedures for blade repair work, so that in the off chance any improper work has been done you can spot it. (See the section on Definitions and Repairs.) *Three*, never fly with a propeller that has exceeded the manufacturer's recommended time between overhauls. Keep the odds in your favor. ■

PROPELLER PREFLIGHTING

- Personally see that the magneto switch is off before you start.
- Position yourself so that you can examine the front and back of the blades without leaning over or around them—keep your body out of the arc at all times.
- Look over the entire blade from tip to shank, not just where you expect to see damage. Use your hands as well as your eyes; running a thumbnail along the edge is a good quick test. Write down any observable changes and take them up with a mechanic.
- Look across the arc to see whether the blades are out of line, or bent.
- Standing clear, grasp the blade tip and test for looseness by pulling fore and aft.
- Check the hubbolts for rust or looseness. Look for oil leakage.

MANUFACTURER'S OVERHAUL RECOMMENDATIONS

Hartzell Overhaul and resurface every 1,000 to 1,500 hours, depending upon engine model. With any engine use lesser interval if aircraft parked outside. No interval should exceed four calendar years.

McCauley Variable pitch: Overhaul every 1,000 hours or less.
Fixed pitch: Overhaul whenever indicated by repair conditions.

Sensenich Overhaul and resurface every 1,000 hours or less.

Note: All manufacturers stress the need for daily careful preflight inspection and prompt maintenance for any blade damages or corrosion, as well as immediate compliance with FAA Airworthiness Directives. Propellers occasionally turn up in repair shops in noncompliance of A.D.s of many years standing—users of such propellers are living on the thin edge of disaster. Owners may write directly to the manufacturer for advice or literature, at the following addresses:

Hartzell Propellers, Inc.
350 Washington Ave.
Piqua, OH 45356

McCauley Accessories
3535 McCauley Dr.
P.O. Box 430
Vandalia, OH 45377

Sensenich Corp.
Box 1168
Lancaster, PA 17604

LOGGING TIME

Slightly Less Complicated than the IRS

Meadowlark, Ala., February 7

Dear Pappy,

What do you know, your former befuddled student, who you always voted most likely to decease at an early age, has finally straightened up and learned to fly right. If you don't believe me cast your eyes on the copy of my flight instructor's certificate hereby attached. What do you think of that? Probably enough to make an old timer like yourself throw in his ticket and run for shelter, right?

Well, I know I'll never have the experience you have to draw on, since I wasn't hatched in the back seat of a Jenny *or nursed by a* Gypsy Moth. *I figure I had about as much natural flying sense to start out as a pin-feathered polywog, but I've learned a few things—thanks to patient old guys like you—so now maybe I'm ready to pass on some of that lore to the next generation of pilots. I had my first student last month and we got along just fine. In fact, I sounded so much like patient old Pappy giving me my first lesson that I had to keep feeling my chin for whiskers to make sure I wasn't you.*

Howsoever, we did get into a little problem the other day when the student was filling out his application for the private pilot certificate—you know, the Form 8710–1. I looked his logbook over pretty carefully and I saw that part of the hours he was claiming for pilot-in-command time came from some flights he had made with another person on board. Said it was a friend of his with an ATR—and a CFI to boot, I think. But he did all the flying, his friend just went along for the ride. He—the student, who is some kind of a lawyer type—claims that since he was flying the airplane without getting any advice, he was the pilot-in-command. In fact, he felt he could log the time both as P.I.C. and as Instruction, since he was under a supervised training program.

What say you, Venerable Master? As ever,

Chuck

Charlottesville, Va., February 10

Dear Charles,

NEGATIVE, NEGATIVE, NEGATIVE. The rulebook says, plain as any fool can see, a student pilot cannot act as Pilot-In-Command of an aircraft that is carrying a passenger. Don't make any difference what kind of rating or ticket the other fellow's got, or whether he opens his mouth. If he (the so-called passenger) has a private pilot certificate or better, he's in command, and if he hasn't he's illegal. That's it.

As for logging Instruction time and P.I.C. out of the same flight, that's okay if your student is flying solo under your supervision (but not with any blankety blank passengers). Just remember that he's got to have at least 40 hours, including 20 hours of solo, *on the tach* before he can apply for the private certificate. He can't take 20 hours in the air, log in 20 solo and 20 instruction, add the two together and come up with his required 40. That would be double dipping, which pilots ain't allowed to do.

Keep up with the good flying and look out for them lawyer types, they'll argue you inside out. Hit them with your trusty FARs.

Your friend,

Pappy

Meadowlark, February 15

Dear Pappy,

Wait a minute, the argument isn't over. What about the instructor—what does he log?

Chuck

Charlottesville, February 20

Dear Chuckles,

Same idea. If the instructor is there to instruct he can log the flight in under Instruction and under P.I.C. Yes, I know, that means you can have two people logging pilot-in-command time for the same hours. Don't try to reason this one out, just let it grow on you.

Pappy

Meadowlark, February 27

Dear Pappy,

Hey, old-timer, good to hear you are still in the groove. We got that lawyer-student type settled down all right, but at the same time I got into an argument with the chief pilot here about P.I.C. time, and everyone else but the night watchman got into the act and nobody's satisfied. Maybe you can favor us with a little more of your venerable light.

Say two pilots go up in a plane and both have private tickets and they're both qualified to fly the airplane. Pilot A is the owner, but he lets pilot B fly some of the time. Who's in command? I say the owner. And suppose pilot B has a commercial ticket or ATR, and pilot A only the private—does that make any difference? Or who's in the lefthand seat?

Much obliged,
Chuck

Charlottesville, March 1

Dear Woodenheaded Chuck

There you go again, spouting off like a bluebellied whale when you haven't even got your feet wet in the flight instructor business. Just let the other fellows talk, and listen. No, the owner isn't necessarily in command. He might have some special legal liability, if there's an accident, but that's for your lawyer friend to play around with. If pilot A and pilot B are both qualified, and private pilots or better, either one could be in command, depending on who's manipulating the controls. Unless—the pilots make some agreement in advance as to who is in command. That happens sometimes, for one reason or another. But it makes no difference who's in the lefthand seat, or in the back seat for that matter, long as it has controls.

Makes no difference either who has the more advanced rating, long as they're both qualified. That rank business is for the birds—or the military. The only time it could matter is if the weather

went down from VFR to IFR and only one of the pilots was instrument rated and qualified.

Say, you fellows aren't doing much airwork, are you?

Pappy

P.S. To put an end to this hogwash, try to get the basic principle in mind. You can only be pilot-in-command if you are qualified for the flight condition. For example (since I know you're going to ask this one) if you're training for an instrument rating you cannot be the P.I.C. in IFR weather or when flying with an official IFR clearance from air traffic control. Only VFR with a hood or a practice IFR approach, etc.

P.

Meadowlark, March 7

Dear Pappy,

One simple question, Old Fount of Knowledge, and you can rest your jawbone. This has to do with cross-country hops, and there doesn't seem to be any clear answer in the FARs, so please be patient. Okay?

Okay. We know that the applicant for a private pilot certificate has to make a cross country flight of over 300 nautical miles, including three legs of at least 100 nautical miles. And for the commercial ticket he has to go 600 n. miles, with legs of at least 200 n. miles. And the IFR student has to make three 50 mile legs IFR. The question is, must this all be more or less continuous flying? Or is it legal to remain overnight if desired, or conditions warrant?

And also, do the legs have to be strictly nonstop? Suppose your student has to make a pitstop, or doesn't feel well, or thinks he has engine trouble—or doesn't like the look of the weather? Does that disqualify him? I await the Word.

Curious Charles

Charlottesville, April

Dear C.C. from C

Believe it or not, you have to think some of these things out, the rules are always going to overlook something. There's no regulation against staying overnight that I know of, but the three individual legs are required to be performed during one cross country flight. The only interruption I would go for on an individual leg would be a genuine emergency, such as mechanical failure or unforecast bad weather. In that case the flight instructor has to provide a written endorsement that he considers the reasons for interrupting the leg to be proper, and not the result of pilot negligence, such as forgetting to check on the weather, the oil supply or the state of his body fluids. The legal types will get around to spelling this out soon enough. In the meantime, try thinking. It doesn't hurt after a while.

The Fountain is closed. Time to fly now.

Pappy

SELECTED EXCERPTS FROM THE FEDERAL AVIATION REGULATIONS

Pilot Logbooks: FAR Part 61.51

(a) The aeronautical training and experience used to meet the requirements for a certificate or rating, or the recent flight experience requirements of this Part must be shown by a reliable record. The logging of other flight time is not required.

(b) *Logbook entries.* Each pilot shall enter the following information for each flight or lesson logged:

(1) *General*
- (i) Date
- (ii) Total time of flight
- (iii) Place, or points of departure and arrival
- (iv) Type and identification of aircraft

(2) *Type of pilot experience or training*
- (i) Pilot in command or solo
- (ii) Second in command
- (iii) Flight instruction received from an authorized flight instructor
- (iv) Instrument flight instruction from an authorized flight instructor
- (v) Pilot ground trainer instruction
- (vi) Participating crew (lighter-than-air)
- (vii) Other pilot time

(3) *Conditions of flight*
- (i) Day or night
- (ii) Actual instrument
- (iii) Simulated instrument conditions

(c) *Logging of pilot time*

(1) *Solo flight time.* A pilot may log as solo flight time only that flight time when he is the sole occupant of the aircraft. However, a student pilot may also log as solo flight time that time during which he acts as the pilot in command of an airship requiring more than one flight crewmember.

(2) *Pilot-in-command flight time*

(i) A private or commercial pilot may log as pilot in command time only that flight time during which he is the sole manipulator of the controls of an aircraft for which he is rated, or when he is the sole occupant of the aircraft, or when he acts as pilot in command of an aircraft on which more than one pilot is required under the type certification of the aircraft, or the regulations under which the flight is conducted.

(ii) An airline transport pilot may log as pilot in command time all of the flight time during which he acts as pilot in command.

(iii) A certificated flight instructor may log as pilot in command time all flight time during which he acts as flight instructor.

(3 *Second-in-command flight time.* A pilot may log as second in command time all flight time during which he acts as second in command of an aircraft on which more than one pilot is required under the type certification of the aircraft, or the regulations under which the flight is conducted.

(4) *Instrument flight time.* A pilot may log as instrument flight time only that time during which he operates the aircraft solely by reference to instruments, under actual or simulated instrument flight conditions. Each entry must include the place and type of each instrument approach completed, and the name of the safety pilot for each simulated instrument flight. An instrument flight instructor may log as instrument time that time during which he acts as instrument flight instructor in actual instrument weather conditions.

(a) A student pilot may not act as pilot in command of an aircraft—

(1) That is carrying a passenger;

(2) That is carrying property for compensation or hire;

(3) For compensation or hire;

(4) In furtherance of a business; or

(5) On an international flight, except that a student pilot may make solo training flights from Haines, Gustavus, or Juneau, Alaska, to White Horse, Yukon, Canada, and return, over the province of British Columbia.

(b) A student pilot may not act as a required pilot flight crewmember on any aircraft for which more than one pilot is required, except when receiving flight instruction from an authorized flight instructor on board an airship and no person other than a required flight crewmember is carried on the aircraft.

Famous
FLYERS

"SMITHY"

The First Man to Cross the Broad Pacific

Among the many claimants for the title, The Greatest Airman Who Ever Lived, the name "Smithy" has a very solid ring, although many pilots flying in this country today have never heard of him. Perhaps that is because he was born "Down Under" in Australia, in the twilight of the last century, and he disappeared from the face of the earth before his accomplishments could become fully appreciated. But in his short, happy exciting life, Air Commodore Sir Charles Kingsford-Smith became a military hero, airline pioneer and holder of half a dozen astonishing long distance flying records—including the distinction of being the first man to fly across the Pacific and around the world over the equator.

Born in Brisbane in 1897, Smithy was one of seven children of a bank manager who later moved to Sydney. Smithy sang in the church choir, frolicked on the beach with his brothers and studied electrical engineering. Flying held no special interest for him until 1914, when World War I broke out. He enlisted in the Signal Engineers and was sent to France as a motorcycle dispatch rider. Then he volunteered for pilot training, won his wings and soon found himself in the thick of the deadly battle with Baron von Richthofen's aerial circus. After sustaining hundreds of bullet holes in his aircraft, Smithy was wounded and shot down, but survived. He was decorated for valor and achieved the rank of squadron leader.

Back home at war's end, Smithy's imagination was fired by the seemingly impossible dream of linking Australia to Europe and the United States by commercial air transport; he was determined to prove that airplanes could safely cross the oceans. To enlist financial support the war hero made a name for himself in civil aviation by barnstorming and setting distance records with flights around Australia. By 1927 he had received a sufficient commitment from local businessmen and the provincial government (New South Wales) to enable him to go to the United States and organize a flight from Oakland, Calif., to Brisbane, by way of Hawaii and Fiji.

The Australian's proposal to fly 7,389 miles over water was regarded as suicidal by most Americans, who in the summer of 1927 had been shocked by the ill-fated Dole Race to Hawaii. (Only two aircraft of the original 38 entrants reached Hawaii, and seven persons were killed en route.)

However, as Smithy pointed out, these were all single-engined airplanes; for over-water flights you needed multi-engine aircraft. A Fokker *Tri-Motor* had succeeded in flying to Hawaii the previous year, and that was the kind of airplane he wanted to buy. The problem was that his funds were limited. *Tri-Motors* came high.

His problems appeared solved when Sir George Wilkins, a fellow Aussie who was exploring the north polar region with aircraft, offered to sell him one of his rebuilt Fokkers for $15,000—sans engines and instruments. Sir George kindly accepted half payment on delivery, so that Smithy could acquire three 200 hp Wright *Whirlwind* engines and the necessary instrumentation to fly the *Southern Cross*, as he named the airplane, across the Pacific.

Reputedly the *Southern Cross* was a hybrid airplane. Wilkins took two Fokkers on his 1926 polar exploration, a *Tri-Motor* called the *Detroiter* (after the Detroit News which supported the mission) and a single engine Fokker, called the *Alaskan*. Both aircraft crash-landed on rough polar ice, with the most serious damage occurring to the *Alaskan*'s wing. Wilkins had all the parts except for that wrecked wing shipped back to the Boeing factory in Seattle where, according to legend, the 72 foot wing of the *Tri-Motor* was mistakenly fastened to the 47'10" fuselage of the smaller *Alaskan*, producing an ugly mongrelized version with exceptional lift. This story is regarded as myth by some historians. Doubters can decide for themselves by observing the restored *Southern Cross* (in the Brisbane Museum at Eagle Farm) or the *Alaskan* (North Dakota Historical Museum, Bismarck).

At any rate the massive wing was built of cantilevered plywood with a maximum chord of 12'6" and a maximum thickness of 33". Four 96 gallon fuel tanks were placed in the wing, with another 106 gallon tank under the pilot seats and a main tank of 807 gallons in the cabin. Fuel from the main tank had to be hand-pumped to the engine.

The three 220 hp *Whirlwind* engines had been chosen chiefly for reliability. (Similar engines had carried another *Tri-Motor* to Hawaii and Lindbergh to Paris.) At their slow cruise rpm (1,650) they would propel the *Southern Cross* at little more than 90 mph, while guzzling nearly a gallon of fuel for every three miles of travel. Still-air range was 3,818 miles, which gave the aircraft about a 20 percent margin for the longest hop—3,128 miles from Honolulu to Suva, capital of the Fiji Islands.

Maximum takeoff weight fully laden would be approximately 17,000 lbs. To handle this load it was necessary to strengthen the landing gear and fuselage and modify the tail section. Smithy test flew the airplane after each modification, giving his personal attention to every little detail. One of his assistants was sent to Hawaii to check on runway lengths at Wheeler Field and other available airfields, since the *Southern Cross* would have to depart Hawaii with every possible gallon of fuel on board.

For all his reputation as a pilot Smithy had virtually no experience in flying solely on instruments—which at that time consisted primarily of a turn and bank indicator, rate of climb indicator, altimeters and magnetic and earth inductor compasses. (A "drift meter" was also used over water.) With characteristic patience he practiced flying "blind" until he was able to overcome his tendency to rely on his strong instinctive sense of direction—since he knew such reliance would be of little help over the broad Pacific.

In the meantime Smithy's supply of funds from Australia had trickled to a standstill, and he had still to make the remaining payment to Wilkins, whose current polar exploration was in danger of becoming stranded at Point Barrow, Alaska, for lack of money to pay for supplies and services. Painfully aware of his indebtedness to Sir George, Smithy hit upon the idea of raising funds locally by using the *Southern Cross* to break the world endurance record of 52 hours and 22 minutes aloft—such a flight would also test their aircraft thoroughly and draw public attention to their proposed Pacific crossing. Backing from an oil company was obtained. Twice Smithy came very close to the record, only to be forced down with mechanical problems after flights of 49 hours 27 minutes and 50 hours seven minutes.

The backers withdraw but fortunately Smithy was able to borrow $7,500 from an American acquaintance, Locke Harper, to send to Wilkins. The airplane was mortgaged to secure the loan.

At the close of 1927, when flight preparations were nearly complete, Kingsford-Smith received a crushing blow. The government of New South Wales in Australia, which had undergone a political shift, decided that the trans-Pacific venture was to be abandoned, the aircraft sold, and he was to return home! In deepest gloom Smithy flew the *Southern Cross* to Los Angeles to negotiate for its sale to the Union Oil Co.

A chance meeting at the airport with one of his well-wishers had an unexpected result. Smithy was introduced to "Captain" G. Allan Hancock, a multimillionaire landholder and ardent yachtsman. Finding the Australian very knowledgeable on matters of marine navigation, Hancock invited him to join his party which was just leaving for a 12 day cruise to Mexico on his palatial 1,400 ton steam yacht, the *Oaxaca*. During most of these 12 days at sea between navigating sessions on the *Oaxaca's* luxurious bridge and endless rounds of champagne and caviar and small talk, Smith racked his brains for an opening that would allow him to interest his host in the plight of the *Southern Cross* without incurring offense. Finally he summoned up his courage to suggest, during a tea party on the afterdeck, that since Captain Hancock had extensive ranches in the United States and Mexico he might oversee them more efficiently with the aid of an airplane.

What kind of airplane would be best?

Well, none better than the old *Southern Cross*.

Surely he wouldn't sell that? How would he get to Australia?

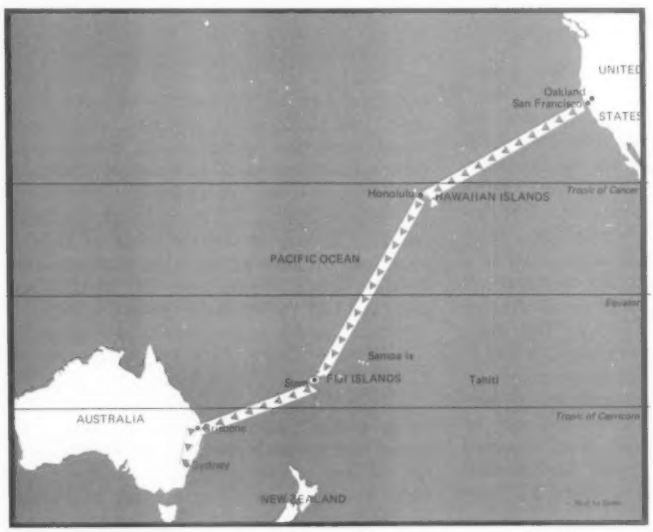
Ah, well. Walk or swim, something like that.

The whole story came out. Hancock immediately offered to buy the *Southern Cross* on one condition: Smithy would then have to test fly it for him by flying it to Brisbane. A nod from this man, and the whole project was in focus again!

Freed of financial worries and his hopes soaring sky high, Smithy now set about assembling his crew. As co-pilot he had selected Charles Ulm, a fellow Australian ex-military flyer who had flown with him on his lengthy flights over Australia when the pair had been forced to remain awake and flying for as long as 29 hours. Two Americans rounded out the crew: Harry Lyon, Jr., experienced naval navigator, and James W. Warner, a veteran of 16 years as a ship's radio operator. With Hancock's generosity they were able to install the best radio equipment available, including both long wave for following radio beacons and contacting ships at sea, and short wave for communicating with shore stations.

At 8:54 a.m. on May 31, 1928, the *Southern Cross* with a crew of four, at a gross weight of approximately 15,000 lbs. including 1,200 gallons of fuel, took off from Oakland on the 2,408 mile leg to Honolulu. Flying between 1,000 and 7,500 feet, dodging clouds and occasionally flying blind, they stayed right on the beacon and made their landfall with fuel to spare, 27 hours later.

Route of the Southern Cross from Oakland to Brisbane.



The next morning at dawn they set out over an ocean no one had ever flown over before 3,144 miles of water speckled by several hundred tiny isles, mostly uninhabited, between them and Fiji. After about 700 miles they lost the radio beacon; from this point on it was essentially dead reckoning. The weather soon worsened, with heavy rain and thick clouds dogging their path, forcing them to climb to 10,000 feet to avoid frightening turbulence. They were 34½ hours out of Hawaii and down to their last 300 gallons of fuel when the brown hilly harbor of Suva, capital of the Fiji Islands, came into view.

After a two day layover in Suva, the rested crew took off on the last and shortest leg of the flight, the 1,795 miles to Brisbane. Given the distance they had covered, the fliers now expected little trouble reaching Australia. However, they were soon greeted by the most violent storms encountered on the entire trip. Water poured into the cabin, drenching and chilling the crew. Their compasses became unreliable and Smithy was flying blind much of the time, with Ulm helping to steady the wheel. Finally they broke clear of the storm, sighted land and flew into Brisbane the following morning to receive an uproarious welcome. Flying time was 83 hours 43 minutes; elapsed time was just over 8 days—halfway around the world.

Made a present of the *Southern Cross* by his American benefactor. Smithy completed an historic first flight to New Zealand, and then in 1929 continued his odyssey around the world, by way of India, Baghdad, Athens, Rome and London. After the "Old Bus" was overhauled for him by the manufacturer, Anthony Fokker in Holland, Smithy flew to Dublin, using Ireland as his takeoff point for the first east-west crossing of the Atlantic by an aircraft. Once again he experienced compass failure, storms, clouds and fog most of the way, but 31½ hours later he landed on target in Newfoundland. After a visit to New York he continued on to San Francisco, where the celebrated *Southern Cross* touched down for the last time.

Since he had changed crews several times en route, Smith was recognized as the first and only man to have circled the world by air across the equator. Not content with this, in the following year he flew another *Tri-Motor*, the *Southern Cross Junior*, solo from England to Australia. His uncanny ability to navigate in all kinds of weather brought him world-wide acclaim.

By this time his point had been proven. Australia had become an air-minded nation, and Smithy was able to participate in the founding of one of the many commercial air carriers that were springing up in his country. He was married in 1930 and soon became the father of a son (Charles Kingsford-Smith, Jr., now in the U.S.)

Promoted to Air Commodore and knighted by King George of England, Smithy was still not ready to settle down. New long distance speed records were being set by a new generation of swift; powerful, single-engine aircraft, eclipsing the marks established by the staid but steady old *Tri-Motors*. Never one to be left behind, Smithy acquired a Lockheed *Altair* in England, and in 1935 attempted to claim a new speed record for the flight to Australia. His decision to ignore his old maxim, "You need three engines and a good radio to cross the ocean," proved fatal.

Taking off on November 6, with John Pethybridge as co-pilot and mechanic, Smithy reached Allahabad in India two days later. This sleek blue and silver *Lady Southern Cross* was refueled and departed for Singapore, but never arrived. For a year and a half not a trace of the men or the aircraft was found. Stories persisted that the infallible Smithy was alive and a captive in the jungles, but these soon dissipated. In 1937 the tail wheel and part of the supporting structure of the *Lady* was found floating off the Burmese coast near the Isle of Aye, 1,400 miles from Allahabad. In recent years Australian searcher have found other pieces of aircraft metal under the sea in this area, but a thorough underwater search is still awaiting clearance from the Burmese government.

Before embarking on his last flight, he commented, "At 38 . . . I still sigh for uncharted spaces and new worlds to conquer. . . . To be sure, I have a nice little air business in Sydney, but my heart is in adventure and the last frontier is in the air." ■

MOVING UP. Designing a 10½ inch paper airplane, which flew 96 feet to a first place finish in a national paper plane flight competition, won this brand new airplane plus flying lessons for Joe Chandler, of Oswego, Ill. Joe looks ready to make the transition.

Proposed Rule Would Simplify Airworthiness Certification of Amateur-built and Other "Experimental" Aircraft

FAA is proposing to eliminate the rule requiring agency inspectors to carry out annual airworthiness recertification of amateur-built aircraft and certain other types of aircraft classified as experimental. A Notice of Proposed Rulemaking to this effect was published in the Federal Register on February 23, 1979, and public comments are invited.

Under the proposed rule an airworthiness certificate would still be required initially, but would be valid for an indefinite period. Amateur-built and experimental aircraft would then require an annual inspection, similar to that required for commercially built and type-certificated aircraft, and performed by an airframe and powerplant certificated mechanic. However, this annual inspection could also be carried out by the amateur aircraft builder, if the builder qualifies for a new type of "repairman's certificate" issued by the agency.

The repairman's certificate could be granted only to the primary builder of the aircraft, who must be a United States citizen at least 18 years of age, and who must demonstrate that he has the requisite skill to determine whether the aircraft is airworthy.

The rule change is expected to result in cost savings to the Government of approximately 22 man-years annually, and to bring considerable relief to aircraft owners as regards time-consuming paper work and compliance costs.

The proposal, which would apply to exhibition and racing aircraft as well as amateur-built planes, would not include aircraft which are test models or research and development models of factory-built aircraft. The decision to make the rule change originated with FAA Administrator Langhorne M. Bond, after a determination had been made that amateur-built aircraft were essentially safe, and had no need of stricter airworthiness requirements than other aircraft.

Comments on this proposal should be sent (in duplicate) to FAA, Office of the Chief Counsel, Attn: Rules Docket (AGC-24), Docket No. 18734, 800 Independence Ave., SW, Washington, DC 20591. The deadline is May 4, 1979.

Cross-Channel Flight Offers New Challenge to Birdmen

British Industrialist Henry Kremer has put up a new purse of 100,000 British pounds (approximately $200,000) for the first man-powered aircraft to fly over the English Channel under specified conditions. The first Kremer prize of 50,000 pounds, for a man-powered flight of one mile duration over a gure eight course, was won by an American team from southern California in August 1977 in the Gossamer Condor. The minimum distance across the English Channel to France is approximately 20 miles.

Entry forms for this competition as well as complete details on requirements may be obtained from the Secretary, Man Powered Aircraft Group, The Royal Aeronautical Society, (RAeS), 4 Hamilton Place, London, WIV OBQ England.

Owners, Pilots Cautioned On Lithium Sulfur ELT Batteries

In connection with the current Airworthiness Directive requiring *immediate removal of lithium sulfur dioxide batteries* from all U.S. civil aircraft (because of danger of their exploding in flight), FAA has notified aircraft owners to have their Emergency Locator Beacon unit inspected to determine whether it is powered by such a battery. These batteries are primarily used with locator beacons, but may also be installed with emergency lights or similar equipment—all lithium sulfur dioxide batteries are to be removed. In a recent six-month period, six of the batteries exploded, in one case, tearing a four-inch hole in the fuselage. Corrosion caused by leaking batteries destroyed the auto-pilot on one aircraft and ate through a set of control cables on another. More than 500 minor incidents also were reported in the same period.

Aircraft may be flown for 180 days, effective March 28, 1979, without the required Locator Beachon while the problem is being investigated by the agency. Proper inspection will in many cases require removal and disassembly of the entire unit, since the lithium sulfur dioxide batteries are not always marked for identification, and may have been substituted for other batteries. As many as 60,000 aircraft may currently have these batteries on board. Placarding the airplane to inform pilots that the ELT has been removed is advised.

Helicopter Technical Manual

FAA's Basic Helicopter Handbook, a technical manual for airmen seeking certification as a private or commercial pilot or instructor pilot with a helicopter rating, has been revised and updated.

The handbook contains a thorough discussion of rotorcraft aerodynamics, as well as a description of major components. Also included are an introduction to helicopter flight manuals, an explanation of hazards to flight and of critical conditions, and a detailed analysis of helicopter maneuvers. General subjects such as weather, avionics and navigation are not covered.

The publication, FAA Advisory Circular AC 61-13B, may be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The price is $2.75 (SN 050-011-0074-7).

Flight Instructor Testing

Designated pilot examiners are now authorized to perform the testing required for original issuance or reinstatement of flight instructor certificates. This authority was previously limited to FAA inspectors.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Advising Touch and Go

What with the fuel situation being what it is, I wonder why pilots shooting landings can't declare their intentions early in the pattern. It doesn't take much airtime when calling downwind to add "touch and go" or "full stop." With this information, following aircraft can space themselves accordingly. A lot of fuel could be saved on the downwind and on top of that it is just plain polite. Instructors should take the lead in this. I thought the E.G.T. article was excellent.

William H. Silcox
San Francisco, Ca.

Your suggestion makes sense. However, bear in mind that a pilot intending to touch and go might decide to stay on the ground if he lands long or has some problems getting lined up. Make sure the runway is clear before you follow .

• Oxygen Masks at Altitude

Thank you for publishing Mr. Stasko's clever and useful Q.R.A.C. in your July issue.

As an airline pilot I am interested in crew oxygen requirements. My only reference is FAR 121.333(c)(2). This states that with quick donning masks, one pilot must wear the mask when the other leaves his station above FL 250, not the more sensible 350 as shown on your chart. Has this FAR been amended or superseded?

Darrel Yoder
Newton, N.J.

Negative. The chart is based on the provisions of Part 91 of the Federal Aviation Regulations, which is the basic FAR for flight operations. Part 91.32 establishes FL 350 as the point at which any pilot is required to wear his oxygen mask continuously when alone at the flight deck. A further restriction is placed upon airline pilots by Part 121, as you indicated.

• Winds Aloft in the Mountains

Your mountain flying issue (August 1978) was very good, but as a long time aviation meteorologist and pilot, I found a glaring omission in your Ten Commandments. No mention was made of the winds aloft, which I feel are vitally important in making a go/no-go decision on a flight over mountains. My personal policy is, when the upper winds exceed 35 knots at ridge level, I head for the nearest pub!

Norman Schuyler
Harbor City, Cal.

• "Niner"

Since you asked, (Radio Response, Nov/Dec 1978) intelligent adults might also use "niner" to prevent confusion with the German word for NO.

A very useful publication. The only one I recommend to my private pilot ground school students. As such I support your efforts to keep the subscription price within their, and my, budget.

William A. Taylor
Renton, Wash.

• Adjunct States? Never

After reading the article "Radio Response in the Nov./Dec. issue, which encourages the use of more precise communication, I was sent scurrying to my dictionary by your use of the term ". . . adjunct United States, Puerto Rico, and the Virgin Islands" in the article "Instrument Approach Plates Issued in Bound Volumes."

After studying the definitions of "adjunct", "conterminious," and "contiguous," I still don't know for sure if Alaska and Hawaii are to be included in the new system, although I suspect they are. Please clarify. Possibly a better choice of adjective might have been "fifty" in lieu of "adjunct."

J. L. Felton
Salt Lake City, Utah

"Adjunct" was a misprint for "adjacent" which means the 48 states that border on at least one other state. "Conterminous" and "contiguous" are used in some FAA publications with the same intent.

• Aging Mr. Ader

I enjoyed the article on Clement Ader. My concern is with your proofreaders; towit: "In 1871 a 40 year old . . ." (1st column) "Ader was born April 2, 1841, . . . (2nd column). Though his accomplishments are difficult to establish, surely his age is not subject to a 10 year variance.

Roger D. Hines
Columbia, Mo.

Glad you enjoyed the article and sorry about the typo.

• Identifier Beacons

I have noticed something on my new San Antonio sectional chart that neither I nor anyone of my fellow pilots understand. Inside the Midland (MAF) VORTAC identifier box, in the left hand corner, the insignia "326MA" is printed in red. The explanatory legend for the chart shows such a box with the numbers "362" in red but no letters, and no explanation.

Perhaps I missed something in ground school, or is this new for us pilots?

J. R. Nichols
Austin, Texas

The insignia 326 MA is the frequency of the non-directional beacon for Midland Airpark (MA). When the beacon is not located at the airport, the frequency is given alone.

• Cleared Airborne ? ? ?

I have heard the expression "Cleared Airborne" used several times by controllers and by pilots of helicopters. Is that a special kind of clearance, or is it simply the expression used to clear helicopters for takeoff?

Name withheld

There is no authorized air traffic control phrase such as "cleared airborne." Helicopters, like other aircraft operating at controlled airports, are required to taxi from a parking location to a point where a takeoff can be authorized. Some helicopters are able to taxi on the surface, others must "air taxi." In either case a takeoff clearance must be given by the control tower before the actual departure from the airport.

• Service Fees

I have read that A & P students may have to start paying $621.50 in order to take their written examinations for mechanic certification. This is the first that I have heard of such fees. Please explain in detail what is transpiring here.

Robert Klein
Glennallen, Alaska

A schedule of increased fees for FAA services to airmen was proposed on April 20, 1978. A subsequent Congressional action, the Airline Deregulation Act of 1978, stipulated that any such change in fees must be specifically approved by an act of Congress. Congress has not yet approved proposed fees.

INSTRUMENT CORNER

• About that RNAV Suffix . . .

In your September issue Instrument Corner you printed a letter concerning the suffixes that should be used on flight plans to designate avionics capability of the aircraft. In your reply you state, in part "You should always indicate your RNAV capability on your flight plan, even if you are not requesting an RNAV route, because sometimes ATC could expedite your flight if they know you have the equipment.

This is not necessarily so. It is true *only* if the RNAV equipment is certified in accordance with AC 90-45A. Please print this to avoid many some flight plans marked incorrectly.

H. Headley
Valley Stream, N.Y.

True; pilots who are doubtful if their RNAV equipment meets the certification requirements can get this information from your local Flight Standards District Office. (RNAV, or Area Navigation equipment allows the use of routes other than those determined by ground facilities. AC 90-45A is available from DOT/FAA Distribution Unit, M/443.1, Washington, DC 20590.

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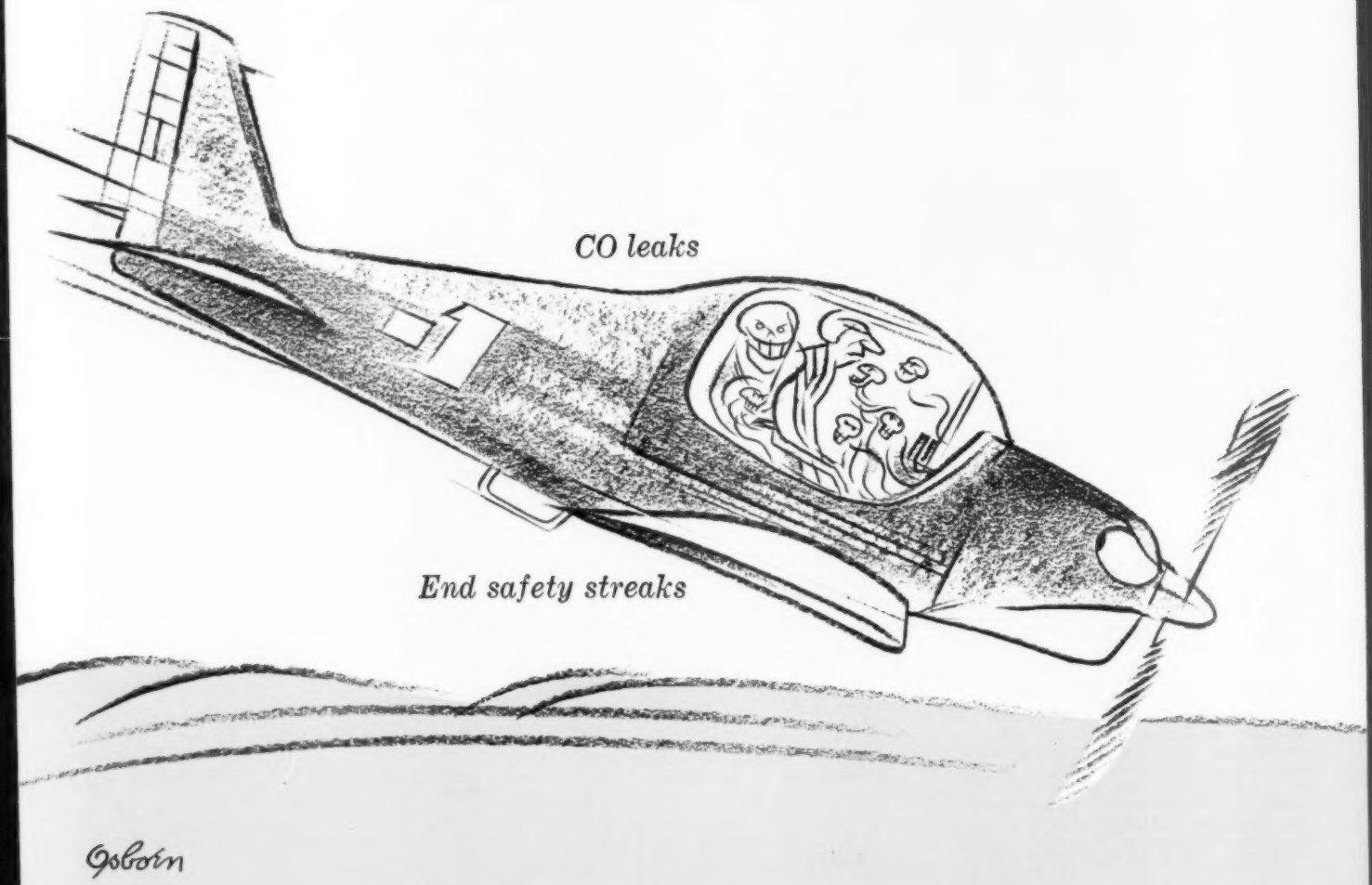
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